Project Code and Title

B.02.01.02.06 Experimental Lower Extremity Injury Research Effort

Project Objective

Conduct detailed experimental investigations at the University of Virginia to obtain data for determining mechanisms of injury and response for lower extremities in automotive crashes. To be specific, conduct 12 dummy and 17 human cadaver frontal sled tests per year to study lower extremity trauma. In a five year period (FY93-FY976), 60 dummy and 85 cadaver sled tests will be conducted

Background

With the intruduction of air bags and the increased surviveability of crashes, hospital and trauma centers are seeing increasing numbers of lower extremity injuries. Although there are usually not life-threatening they are costly to treat and involve lengthy rehabilitation and loss of earning for patient.

Problem Definition

Various accident surveys suggest that the mechanisms of ankle/foot injuries are numerous and difficult to pin down. Some of the major mechanisms of ankle/foot injuries are:

1. Axial loading through the plantar surface of the foot
2. Dorsiflexion/plantaflexion of the foot
3. Inversion/eversion of the foot
4. Internal/external rotation of the foot

In an automobile crash, one single mechanism of the injury rarely occurs. However, combinations of these mechanisms are common. High axial loads combined with foot rotation are common causes of ankle foot injuries. Crashes with large toepan intrusion in conjuction with the initial orientation of the foot may cause severe foot rotation.

Research Approach

Twelve dummy and 17 cadaver sled tests per year will be conducted to study lower extremity injury. The upper part of the torso will be restrained by a variety of air bag and belt restraint systems. Over five years (FY93-FY97), 60 dummy and 85 cadaver sled tests will be conducted. In addition sixty human cadaver lower legs will be impact to establish ankle/foot tolerance level with regard to 4 injury mechanisms mentioned above.

Potential Impact/Application

By better understanding injury mechanisms the project will point to further design approaches and research testing devices (such as HYBRID III, SID etc.) which can contribute to reduced injury severity and cost in this area.

Key Milestones

- To establish foot/ankle injury criteria by September 1997.

RESOURCE REQUIREMENTS	FY 93	FY 94	FY 95	FY	FY
Contract Money ($K)	474	400	463	545	545

Project Manager(s)

Nopporn Khaewpong

Completion Date

April 1998

Project Tasks

Task	Title and Description
Task 1:	Develop Test Apparatus and Experimental Protocol
Task 2:	Run Preliminary Tests
Task 3:	Run Cadaver Experiments

Task	Start Date	Projected Completion Date	Status/Responsibility
1	5/93	open	In progress
2	7/93	open	In progress
3	10/93	12/97	In progress

Supporting Contracts

Task	Contract Number	COTR (phone)	Contracting Officer (phone)	Total Contract Cost ($K)
	DTNH22-93-Y-07028	(202)366-4703	Lamont O. Norwood(202)366-8573	2700